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Limb salvage in osteosarcoma using autoclaved tumor-bearing bone

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Abstract

Background: Tumor prostheses currently give the best short- and medium-term results for limb-salvage reconstruction procedures in the treatment of bone tumors. However, in developing countries, the cost of a tumor prosthesis is beyond the reach of much of the population. We report the use of autoclaved tumor-bearing bone in 10 patients, as an affordable alternative to the use of prostheses.

Methods: This is a case series of 10 patients (mean age 19 years) with osteosarcoma who were treated at our hospital from 1998 to 2008, and followed up for a mean of 35 months (range 14 to 8). The femur was involved in six cases, the humerus in three cases, and the ulna in one case. The mean length of the autoclaved bone was 150 mm (range 60–210).

Results: Bone union occurred in seven patients over an mean duration of 12 months (range 8–17). Three patients had non-union. Two of these had associated implant failure, with one of them also developing chronic infection, and the third is still being followed up. Two other patients had local recurrence.

Conclusion: The use of autoclaved tumor grafts provides an inexpensive limb-salvage option without sacrificing appropriate oncologic principles. A painless and stable limb is achievable, and the use of this technique can be further refined.

Background

After many decades of limb-salvage surgery for bone tumors, it seems clear that tumor prostheses give the best results in terms of function and comparative paucity of complications, at least in the short and medium term [1]. Most studies on tumor prostheses have been carried out in centers located in wealthier countries, and in poorer countries, these prostheses are simply not affordable. According to the World Health Organization, 80% of the world's population live in developing countries, thus the availability and affordability of these state-of-the-art techniques for these populations is limited [2]. For example, in our own hospital, the cost of a prosthesis is equivalent to 2 years' wages for the average patient. Thus, even though limb salvage is often possible,

amputation is carried out because the patient is unable to afford the alternative [1,3].

In this study, we used autoclaved tumor-bearing bone as an affordable alternative to a prosthesis, requiring only the material and equipment used in fracture treatment. For tumors in the upper limb, the autoclaved bone acts as a spacer, whereas for the lower limb, it is used mainly for fusion at the knee joint. Initial complication rates of this technique are higher, but once union is achieved, the function of the salvaged limb is acceptable and achieves better results than with amputations of the arm with loss of the hand or with above-knee amputations of the leg [4]. It also provides a stable lower limb, and avoids the common sequelae of loosening of a prosthesis [5].

Methods

This was a retrospective case series. From 1998 to 2008, 18 patients with primary malignant tumors involving the limb bones were treated with wide excision and reconstruction using the patients own bone tissue, which was

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